



Early Spectrum Consideration Delivers Results

By the DON CIO Spectrum Team

When bombers in postwar Iraq launched a new wave of attacks against U.S. troops last fall, Lt. Col. Steve Russell's innovative thinking spoiled one of their key tactics. As reported in *The Washington Post*, Russell used his knowledge of electromagnetic spectrum to scuttle remote control bombs that the Iraqi insurgents were making out of radio-controlled toy car transmitters, augmented with C-4 plastic explosives and blasting caps. Mounting one of the car controllers on his humvee dashboard, he took advantage of the toys operating on the same frequency to create an anti-explosive device.

Although the equipment in this example is primitive, spectrum supportability is as much a challenge and concern for the world's most powerful military as it is for our enemies. Today, virtually all new U.S. military systems used for combat operations rely on spectrum. So it is critical that they be developed with a forecast as to other spectrum-dependent systems that could be in use in the same time and geographical space — and that they take advantage of frequency ranges, antennas and power that will not cause or allow interference.

The failure to plan for spectrum dependency in the research and development stages — and the resulting discovery of spectrum-related problems shortly before deployment — have produced delays, cost overruns and, in some cases, useless (and very expensive) systems that cannot be fixed for combat operations.

The Department of the Navy is taking steps to ensure that its newer spectrum-dependent equipment does not become a victim of poor spectrum planning. Working through the Navy and Marine Corps Spectrum Center (NMSC), the Department is promoting a comprehensive spectrum supportability process with detailed operational, engineering and administrative procedures to coordinate the Navy's use of required frequencies. The process is a key part of the vision outlined in the Department of Defense Electromagnetic Spectrum Management Strategic Plan, which directs that spectrum requirements be established early in the program definition phase, and reviewed throughout the development and acquisition cycles.

NMSC is actively reaching out to educate program managers who help to design or procure spectrum-dependent systems about the spectrum supportability process. These outreach efforts scored a major victory earlier this year. For the first time ever, spectrum supportability became part of course instruction at the Defense Acquisition University.

The DAU course in which spectrum supportability is taught, SYS 301, "Advanced Systems Planning, Research, Development and Engineering," is a 10-day on-site class for DoD civilians and military officers who are Level II certified in the Systems Planning, Research, Devel-

opment and Engineering career field. The course examines science, technology, and the systems engineering processes throughout a systems life cycle by using relevant case studies and exercises involving all acquisition phases and milestones. The SYS 301 course is scheduled to be conducted by DAU at 30 locations in 18 states through October 2004.

"Early consideration of spectrum requirements within systems engineering is important, and the DAU course helps us share that message," says John Lussier, the DON Director for Spectrum Policy and Planning. "We want program managers to walk away knowing what they can do to ensure their equipment has access to the frequencies required to enable the delivery of superior capabilities to our warfighters."

In addition to describing the spectrum supportability process — including equipment certification, frequency assignment, and host nation coordination/approval, the course is helping students develop an understanding of other key spectrum issues. Discussion topics include government and private-sector influences affecting spectrum availability and allocation, and regional and international spectrum forums, such as the International Telecommunication Union that helps to resolve spectrum development and infringement issues between countries.

Another NMSC-led outreach initiative is spectrum training courses offered by the Department of Commerce National Telecommunications and Information Administration (NTIA). For the past several years, NMSC has presented the DoD portion for the Spectrum Management Seminar (open to U.S. government employees and contractors) and the U.S. Telecommunications Training Institute Radio Frequency Spectrum Management Course (open to representatives from developing nations).

NMSC is also reaching out to DON organizations to provide education and guidance on supportability issues. The NMSC recently briefed the Naval Research Laboratory's Radar Working Group on spectrum supportability. The Laboratory's Radar Division conducts research on physical phenomena, such as electromagnetic spectrum, that are of importance to radar and radar-related sensors.

As the DON works to educate personnel about spectrum supportability, it is also conducting research into emerging technologies that offer additional options for managing spectrum. Ultra-wideband and neXt Generation (XG) communications are two such tools being examined that can, in some instances, enable spectrum-dependent systems to dynamically sense and use, unused or underused spectrum on their own.

"For our transformation to net-centric operations and warfare to be successful, we must ensure that our new systems can obtain adequate spectrum," says Lussier. "The success of our efforts to educate people about spectrum supportability coupled with our research into nascent spectrum technologies, will be major factors in determining how well we harness this resource in the years to come."

For more information or to sign up for the SYS 301 course, please visit the Defense Acquisition University Web site at www.dau.mil.

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